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the work is being continued. The results already obtained prove that there are no currents in the open Gulf much exceeding one knot—a rate practically inappreciable by modern steamers. Much misapprehension formerly existed on this point, which should be removed by the extensive publication of the results. As these have been summarized in all the leading maritime periodicals, ignorance of them by sailors is inexcusable. It is unnecessary to emphasize the importance to the navigator of reliable information of this character.

FOREST RESERVE IN THE SOUTHERN APPALACHIANS.

No more interesting Government report has been issued in many years than that here noticed bearing the title:

> Message from the President of the United States, transmitting Report of the Secretary of Agriculture, in relation to the Forests, Rivers and Mountains of the Southern Appalachian Region.

The President's Message is short but emphatic, and the Secretary's Report, going somewhat into detail, is followed by appendices, with full treatment of special themes.

A reserve in this region was first urged upon Congress in 1900, by the Appalachian Mountain Club in New England and by the Appalachian National Park Association of the Southern States, and the sum of $5,000 was at once appropriated for investigation. The needed field studies were made in 1900 and 1901, and were far more extended than could be provided for by the appropriation, owing to the vigorous co-operation of the United States Geological Survey. The work covered parts of six States.

The Southern Blue Ridge and the Unaka Mountains are described—the highest region in North America that is covered by hardwood forest. The river bottoms and water-powers of the Piedmont Plateau depend on the regularity of the streams rising in these mountains, and such regularity hinges, in turn, upon the preservation of the forests. No glacier has invaded the region, the rainfall is abundant, and the development of the forests has been unimpeded for geological periods, until now 137 species of trees are found there, and a still greater variety of shrubs.

The variation of altitude is great enough to affect the distribution in a marked way: On Mount Mitchell, oak, hickory, maple, and chestnut grow at the base, followed by hemlock, beech, and birch; while above are spruce and balsam, and higher still are shrubs and dwarfed trees. The humus is often a foot or more in thickness, a formation all-important, easily washed away, and not to be replaced in centuries, if at all. Many slopes have been cleared, cultivated a few years until the soils were run out, and then abandoned.

The lumbermen have sought the rarer woods, or in many places have cut everything that would sell, felling the desired trees without regard to what they would crush, and leaving the waste to propagate destructive forest fires. So far have the ravages gone that it would be too late, after another decade, to save these splendid forests. Not more than 10 per cent. of this mountain land has slopes of less than ten degrees, and yet 24 per cent. of it is already cleared, exposing great areas on hillsides that should have been allowed to keep their protective cover. Grass, forming a strong turf, will not here, as in the cooler climate of New England, bind the soils from washing.

The soils, even of the valley farms, are removed by the floods, and many thousand acres of rich bottom lands were in this way damaged, or ruined, during the year in which the report was written. The forests and the farms, therefore, can only be rescued by setting the region apart as a public reserve. There is also more than a million horse-power of undeveloped water-power available along the streams of this region. The uniformity of flow is in exact ratio to the preservation of the forests, and, where cutting has been excessive, water has often had to be supplanted by steam. It is a question of water storage; and as there was no ice invasion, and as there are no lakes, the humus cover is the sole means of hoarding the waters and doling them out so as to serve the millwheel and save the field.

Being a region of heavy rainfall, floods will be great and enormously destructive. A single storm at the sources of the Catawba River, in May of 1901, ravaged the lower river country for more than 200 miles, and cost the farmers one and a half million of dollars. Another storm in August of the same season did another half million dollars of damage. The May floods of the entire region carried the losses to $7,000,000, and, adding the other floods of the year, the destruction of property in 1901, in the Southern Appalachians, amounted to $10,000,000. National reservation is the only means of averting such stupendous calamities, for the States concerned are not able to bear the financial burden; and, moreover, the separate States, as North Carolina, give rise to the streams whose havoc is mainly wrought in other domains. We cannot expect one commonwealth to tax itself for the benefit of its neighbours. The Federal Government should not delay to act upon the matter; and it is believed that, with good forest management, such a reserve should soon become self-supporting.

Appendix A contains several papers descriptive of the forests and forest conditions, including, also, lumbering, accounts of the forest areas by river basins, and a list of native shrubs; Appendix B, by Arthur Keith, of the Geological Survey, deals with the topography and geology; another supplement is devoted to hydrography, and a fourth to the climate. The Report closes with matters pertinent to immediate action in setting apart a reserve. Here are memorials from several scientific and business associations, a report of the Senate Committee, resolutions and acts by the legislators of Virginia, Tennessee, Georgia, and the Carolinas, and a large number of extracts from the press.

After all, the reader will, perhaps, be most deeply impressed by the rich outfit of illustration, showing forests, typical Appalachian views, and, especially pictures of the havoc wrought on slopes and bottom lands by rainwash and resistless floods.

A. P. B.

EARTHQUAKE AND VOLCANIC CENTRES IN THE PHILIPPINES.

This sketch map, showing the distribution of earthquakes and their relative frequency throughout the Philippines, and also the active and dormant volcanoes in the archipelago, has been compiled from two maps in the report recently prepared in Manila by M. Saderra Masó, S.J., Assistant Director of the Philippine Weather Bureau. The information embodied in the map was collected by the Meteorological Station at Manila, and embraces complete records of seismic phenomena for the past eighteen years. Twelve of the volcanoes here shown are more or less active. They include Babuyan, Camiguin, and Didica, in the Babuyanes Islands, north of Luzon; in Luzon, the great volcanoes of Mayon and Taal, besides Bulusan and Bacon; Malaspina, on the island of Negros; Camiguin, on the island of the same name off the north coast of Mindanao; and on Mindanao the volcanoes of Apo, Macaturin, and Calayo.